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PATENT SPECIFICATION ⁽²¹⁾ **36,120/68**

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Int. Cl. (51) E04c.

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Lodged (22) 8th April, 1968.
(Accompanied by a
Provisional Specification).

Complete Specification
entitled (54) **PREFABRICATED FLOORING SECTIONS.**

(Cognate with 38003/68).

X-21. 19-25, 27 - 32

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Actual Inventor (72) **JOHN WILLIAM VOLMAN and ALBERT WILLIAM FRANK DAVIES.**

Related Art (56)

The following statement is a full description of this invention, including the best method of performing it known
to us:

22592/72-1

L85-79-2D-14P.C.

F. D. ATTURION, Government Printer, Canberra

36,120/68

This invention relates to flooring sections and in particular to prefabricated flooring sections which can be laid in place to provide a concrete floor surface.

The invention will obviate the necessity for elaborate moulds and time consuming concrete pouring operations at a building site, by providing flooring sections which can be made to specification at a works, and then brought to the building site and installed. The novel construction of the flooring sections will also facilitate the provision of building services such as electric power and telephone cables.

Accordingly the object of the present invention is the provision of such novel prefabricated flooring sections.

According to a general form of the present invention, therefore, there is provided a flooring section including a plurality of substantially hollow blocks, a plurality of reinforcement members disposed about said blocks, and a concrete filling applied at least, in the spaces between said blocks and about the sides of said blocks.

Preferred forms of the invention will now be described with reference to the accompanying drawings of which:-

Figure 1 is a diagrammatical view of a typical flooring section,

Figure 2 is a plan view of a slightly modified flooring section,

Figure 3 is a cross section along the line 3-3 of Figure 2,

Figure 4 shows the transverse joining of two flooring sections,

36,120/68

Figure 5 shows a plan view of the joining shown in Figure 4, and

Figure 6 shows an alternative form of flooring section adapted for heavy loads.

Each flooring section constructed in accordance with this invention incorporates a plurality of hollow modular blocks. The blocks may be ash or cinder blocks or blocks of any other suitable material. They have a transverse cross section which is generally in the shape of a hollow rectangle with intermediate strengthening ribs. End walls seal the longitudinal extremities of the blocks.

Thus the flooring section depicted in Figures 2 and 3 and denoted generally 1, includes four blocks 2. Each block is provided with strengthening ribs 3.

To form the flooring section, as many of the blocks 2 as required for the particular dimension of section specified, are laid out in horizontal array on the base floor of a horizontal mould. Substantial gaps are left between each row of blocks (corresponding to gap 4 in Figure 2). Where stiffener beams are to be provided intermediate the ends of the section, they are formed by means of gaps left between the adjacent ends of the blocks in the row. Thus section 1 includes a strengthening rib 5. Gaps (corresponding to edge portions 6 of section 1) are similarly left between the blocks and the side and end walls of the mould. The reason for this arrangement will be apparent from the ensuing description.

Steel rod reinforcement members are laid transversely (members 7) and longitudinally (members 8) along the gaps between and at the sides of the blocks. The extremities of these rods are bent at right angles

36,120/68

to provide anchor points against concrete to be poured into the mould so that tension may be maintained in the rods. A layer of spaced steel rod reinforcement members (not shown) may also be positioned above the blocks.

The reinforcement members can instead comprise tensioned wire. The wire may be pretensioned in which case the tension is applied to the wire before pouring of the concrete and maintained in the wire while the concrete sets. The wire is suitably anchored at its extremities against loss of tension.

Alternatively the wire can be post-tensioned, the tension being applied to the wire after the concrete has set. In this case the wire members are positioned in conduits (not shown) which are precast into the concrete. The wire is tensioned after the concrete has set and anchored at both ends.

It is also possible that a combination of steel rod and wire reinforcement members may be used. For instance the upper layer of reinforcement members above the blocks may be steel rod whilst the lower members between the blocks and around the array of blocks are tensioned wire.

Concrete is poured into the mould to a height sufficient to cover the upper layer of reinforcement members and the blocks and provide a horizontal thickness of concrete (indicated as item 9 in Figure 3) above the blocks. The upper surface of this thickness will form the concrete floor surface.

Alternatively the concrete may be poured only to the level of the upper surfaces of the blocks or only slightly thereover. Thus the sections may be supplied either complete as shown in Figures 1-3 or without the upper portion of concrete 9 which acts as a floor finish.

36,120/68

The purpose of this is that instead of installing the floor fully finished, the user may at his option place the floor topping after the sections have been laid.

The side walls of the mould are shaped so that the shape of the side walls of the formed floor section is such that when laid alongside a similar floor section, at the building site, a "key" space such as 10 is left which can then be filled with concrete to provide a continuous floor across the joined sections.

Accordingly each side wall has a longitudinal generally rectangular channel formed therein, intermediate of its lower and upper edge. Thus the wall is in three portions, a lower outwardly extending portion 11, an intermediate recessed portion 12 and an upper outwardly extending portion 13. The upper portion 13 does not extend as far outward as the lower portion 11 so that when the floor section is positioned alongside a similar floor section at the building site, the similar and adjacent lower portions 11 lie flush against one another while a longitudinal gap is formed between the similar and adjacent upper portions 13. Through this gap concrete may be poured into the channel recesses 10 and up to the floor level to form a "key" join between the floor sections. The filling for the channel, extending as it does laterally into the walls of both floor sections, provides a "shear key" abutting against the lower and upper outwardly extending portions to resist shear stresses in the floor.

If required provision may be made for further transverse joining of the sections to supplement the "key" join. Thus as shown in Figures 4 and 5 steel members 14 may be embedded in the concrete of each section at selected points along the upper portion 13. The wall

36,120/68

of the section is recessed at these points. Adjacent members 14 of adjacent sections are joined together by a welded steel plate 15.

The under surface of a floor section is flat and formed partly by the under surfaces of the hollow blocks and partly by the concrete poured into the mould.

Structurally the floor sections are generally in the form of a series of structural "T"'s with stiffener beams, the upper reaches of the "T"'s being formed by the upper continuous horizontal thickness of concrete and the stems of the "T"'s by the concrete in the gaps between adjacent hollow blocks. As is known in the art such a "T" formation is structurally sound from the relevant stress determination point of view. The sections can if required be provided with pre-camber incorporated during manufacture to offset dead load deflection.

If it is desired that one floor section in a building should have greater structural strength than an adjacent floor section, smaller hollow blocks and more reinforcement members may be incorporated into the same overall volume of section. Similarly as shown in Figure 6 if it is necessary that one area of a section be able to withstand greater stresses than another then smaller blocks 16 and more reinforcement 17 may be used in that area.

Figure 6 also shows the provision of a threaded insert 18 to receive a lifting eye.

In constructing a floor, the sections, pre-fabricated to specification, are brought to the site and laid in position across end supports, which may be the walls. The floor sections may be left so positioned whilst other work on the building progresses. Service conduits and cables for such as power and telephone may

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36,120/68

be laid in the unfilled channel key joins. Alternatively they may be laid along the "hollows" in the blocks through holes drilled through the floor surface. To facilitate this draw wires may be left in the "hollows" during construction.

When these services have been installed the joins may be filled to floor level to form a continuous floor surface.

In the appended claims the floor section is to be considered as laid out horizontally, and terms of orientation or configuration are to be construed accordingly.

36,120/68

The claims defining the invention are as follows:-

1. A flooring section including a plurality of substantially hollow blocks, a plurality of reinforcement members disposed about said blocks, and a concrete filling applied at least in the spaces between said blocks and about the sides of said blocks. (8th April, 1968)

2. A flooring section according to claim 1, said blocks being substantially rectangular in plan and having a transverse vertical cross section substantially in the shape of a hollow rectangle. (8th April, 1968)

3. A flooring section according to claim 1 or claim 2, said blocks including longitudinal vertical strengthening ribs therein. (8th April, 1968)

4. A flooring section according to claim 2 or claim 3 the extremities of said blocks being closed. (8th April, 1968)

5. A flooring section according to any one of the preceding claims, said blocks being parallel with spaces therebetween. (8th April, 1968)

6. A flooring section according to any one of claims 1-4 said blocks being positioned in parallel rows. (8th April, 1968)

7. A flooring section according to claim 6 a space being left between the blocks in each row to provide concrete stiffener beams. (8th April, 1968)

8. A flooring section according to any one of the preceding claims said reinforcement members including longitudinal members laid along said section in said concrete between and/or to the sides of said blocks. (8th April, 1968)

9. A flooring section according to any one of the preceding claims said reinforcement members including transverse members in said concrete laid across said section between and/or to the sides of said blocks. (8th April, 1968)

10. A flooring section according to any one of the preceding claims wherein said concrete filling is applied only up to the level of the upper surfaces of said blocks. (8th April, 1968)

11. A flooring section according to any one of claims 1-9 wherein said concrete extends above the upper surfaces of said blocks to provide a flat upper floor surface on said section. (8th April, 1968)

12. A flooring section according to claim 11 wherein said reinforcement members include longitudinal and/or transverse members positioned in said concrete above said blocks. (8th April, 1968)

13. A flooring section according to any one of the preceding claims wherein at least some of said reinforcement members comprise steel rod. (8th April, 1968)

14. A flooring section according to claim 13 wherein said steel rod has an anchoring angle bend at each end. (8th April, 1968)

15. A flooring section according to any one of the preceding claims wherein at least some of said reinforcement members comprise tensioned wire anchored at each extremity. (8th April, 1968)

16. A flooring section according to claim 15 said wire being laid in conduits precast in the concrete, said wire being tensioned after the concrete has set. (8th April, 1968)

17. A flooring section according to any one of the preceding claims, the under surface of the section

36,120/68

being flat and being formed partly by the under surfaces of the hollow blocks and partly by the concrete filling. (8th April, 1968)

18. A flooring section according to any one of the preceding claims, the longitudinal side wall of each section having a generally rectangular channel therealong so that a concrete "shear key" join may be poured in situ between adjacent channels. (8th April, 1968)

19. A flooring section according to claim 18 each said side wall being in three portions, a lower outwardly extending portion, an intermediate recessed portion, and an upper outwardly extending portion, the upper portion not extending to the same distance as said lower portion so that when the floor section is positioned alongside a similar floor section, the similar and adjacent lower portions of the walls of each may lie flush whilst leaving a longitudinal gap between the similar and adjacent upper portions of said walls. (8th April, 1968)

20. A flooring section according to any one of the preceding claims including spaced steel members embedded in the sides thereof, so that said flooring section may be joined to an adjacent section by the welding of a metal plate across each pair of adjacent and similar steel members of the sections. (8th April, 1968)

21. A flooring section according to any one of the preceding claims including blocks of smaller size and extra reinforcement members in areas of the section that have to withstand greater loading. (8th April, 1968)

36,120/68

22. A flooring section according to any one of the preceding claims incorporating pre-camber to offset dead load deflection. (8th April, 1968)

23. A flooring section according to any one of the preceding claims including threaded inserts in the sides thereof to receive lifting eyes. (8th April, 1968)

24. A flooring section substantially as hereinbefore described and as illustrated with reference to the accompanying drawings. (8th April, 1968)

DATED this THIRD day of APRIL, 1969

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SPRUSON & FERGUSON



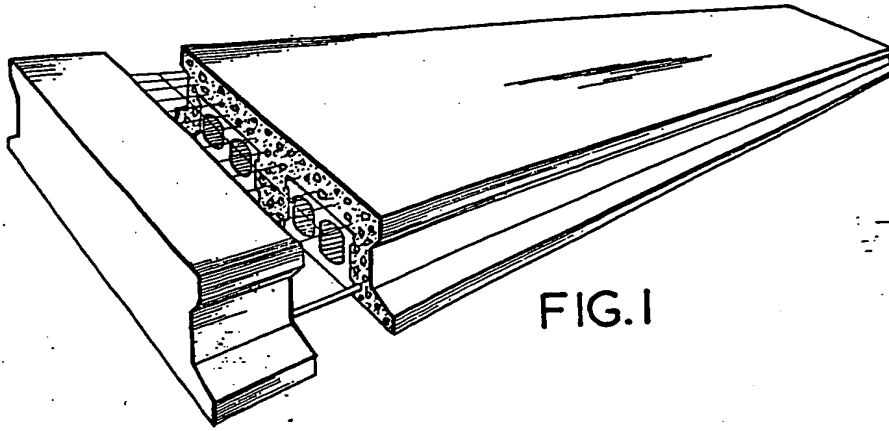


FIG. 1

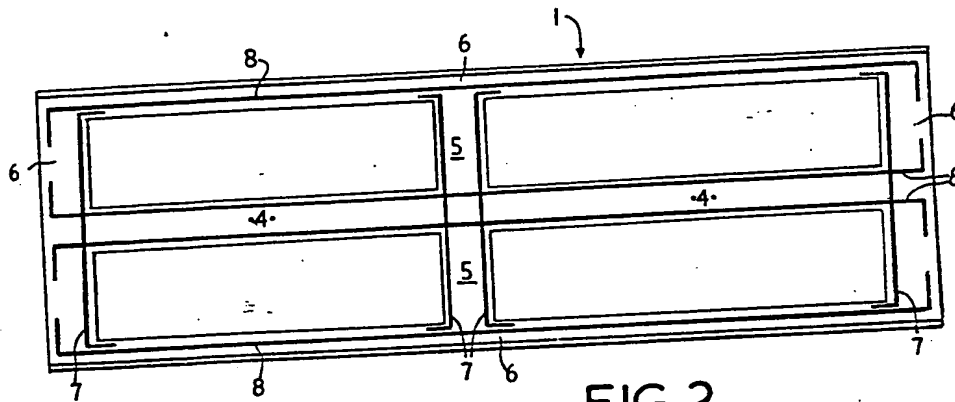


FIG. 2

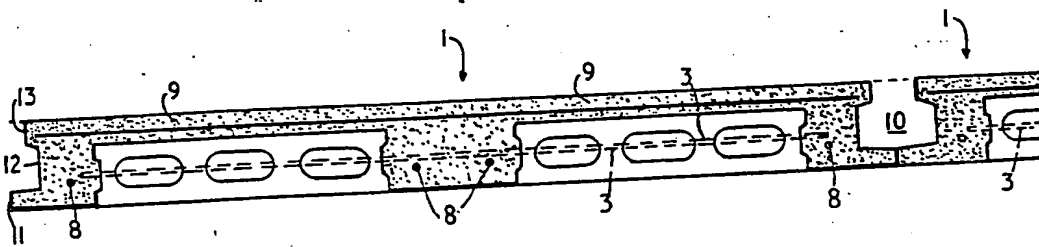


FIG. 3

36,120/68

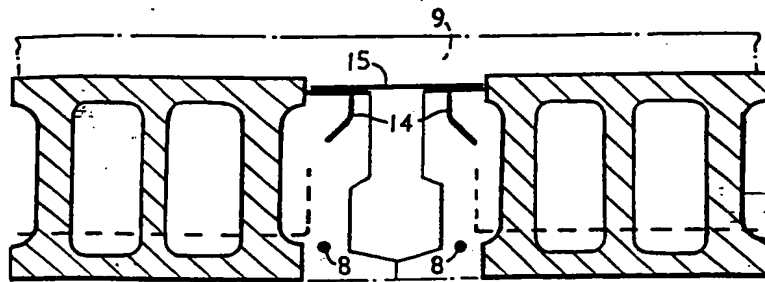


FIG. 4

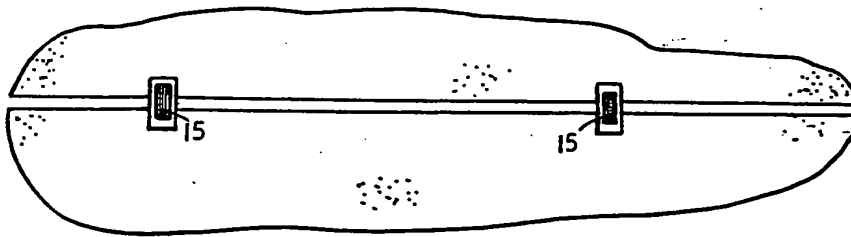


FIG. 5

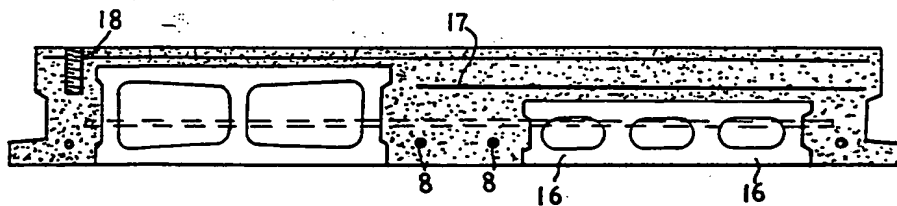


FIG. 6